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The Red-Headed Pine Sawfly

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The red-headed pine sawfly (*Neodiprion lecontei* (Fitch)) is an important defoliator of ornamental, natural-growing, and plantation pines, particularly the hard pines. Although the insect was described in 1858, serious outbreaks and killing of host trees were not common until the establishment of pure pine plantations.

This sawfly occurs throughout the Eastern United States and the adjacent Canadian Provinces and westward to the Great Plains wherever its hosts grow. In the United States heaviest infestations are commonly on pines growing in shade or partial shade, particularly beneath or at the edges of hardwood canopies. In Canada the sawfly shows a decided preference for open-growing trees.

Hosts

The red-headed pine sawfly feeds on many native and exotic pines; but it lays eggs only on hard pines. In general, it prefers to infest trees less than 15 feet high. This insect is often a major problem in young plantations

where hard pines predominate. In various parts of its range, certain species of trees are more susceptible to attack than others. In Canada and the Northern States, jack, red, and Scotch pines are more heavily attacked. In the Central and Southern States, shortleaf, loblolly, longleaf, and slash (*P. ellioti* Engelm.) pines are more heavily attacked.

Most other hard pines, both native and exotic, may be attacked within the range of the insect. Eastern white pine, Norway spruce, and tamarack (*Larix laricina* (Du Roi) K. Koch) are occasionally attacked when growing with the preferred hosts.

Injury

The insect feeds in colonies containing a few to over a hundred larvae. Early damage, which is similar to that of most other coniferous-feeding sawflies, is evidenced by the reddish-brown, strawlike remains of needles incompletely consumed by the young larvae (fig. 1). Older larvae consume the entire needle (fig. 2), generally stripping a branch of all its foliage before starting on another. Old needles are eaten first, but the trees may be completely defoliated, particularly in areas where two or more generations occur annually. When foliage becomes scarce, the larvae feed upon

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Figure 1.—Reddish-brown, strawlike remains of needles fed upon by young red-headed pine sawfly larvae.



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Figure 2.—A colony of nearly full-grown larvae feeding on the needles of a host tree.

the young, tender bark. When a tree is completely defoliated, they migrate to adjacent trees and continue feeding until they are fully grown.

Moderate to heavy defoliation stunts height growth of infested

trees. Complete defoliation is usually sufficient to kill red and jack pines, especially on poor sites. The southern pines, however, often survive complete defoliation, even in areas where several generations of sawflies occur in the same season.

Description

The newly laid egg of this insect is whitish and smooth, has a shining, translucent shell, and averages 1.8 mm. long and 0.6 mm. wide.

The newly hatched larva is about 3 mm. long and has a whitish body and a brownish, transparent head. When fully grown, the larva is nearly 25 mm. long and has a bright-red head. The body varies in color from pale whitish yellow to deep yellow and is marked by two to four rows of black spots on each side of the abdomen (fig. 3). The last abdominal segment has a large black patch on each side.

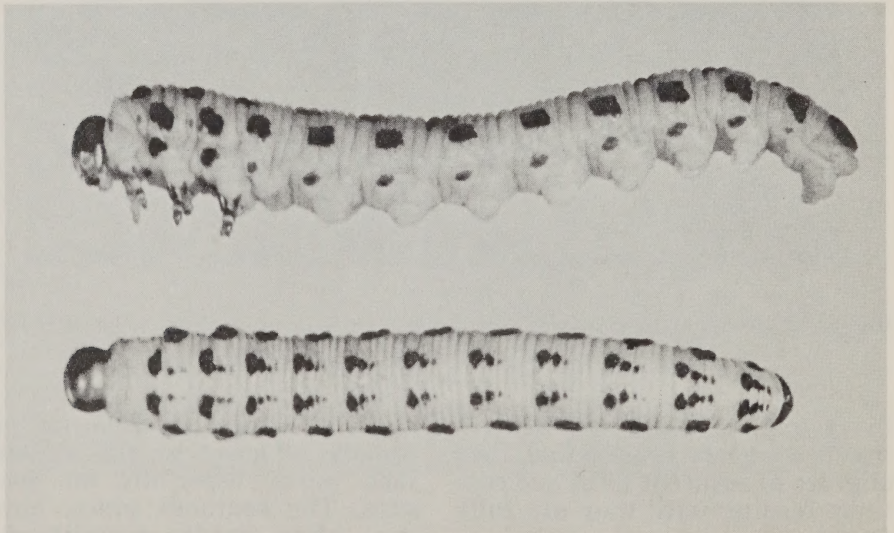
The cocoon is reddish brown, papery but tough, and cylindrical with rounded ends. Small particles of humus or soil may be stuck to it. The cocoon of the male is about 7 mm. long; that of the female, about 10 mm. long. Normally, a cocoon from which the adult has emerged has a large, circular hole at one end.

The adult sawflies have four wings and vary from 5 to 10 mm. in length, the male being smaller than the female. The female is robust, her head and thorax are reddish brown, and her abdomen is black. The male is more slender, is entirely black, and has broad, feathery antennae.

Life History

The sawfly overwinters as a prepupa in a cocoon spun in the litter or topsoil beneath its host. Pupation occurs soon after the advent of warm weather, and emergence of the adult follows in a few weeks. Some prepupae may remain in a resting state called diapause over several seasons before emerging.

The female deposits about 120 eggs in the current or previous year's needles. They are laid individually in a row of slits or pockets located in the edge of the needle (fig. 4). All the eggs laid by one female are generally clustered on needles of a single twig. Egg laying may occur before



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Figure 3.—Side and top views of fully grown larvae of the red-head pine sawfly (X 4).

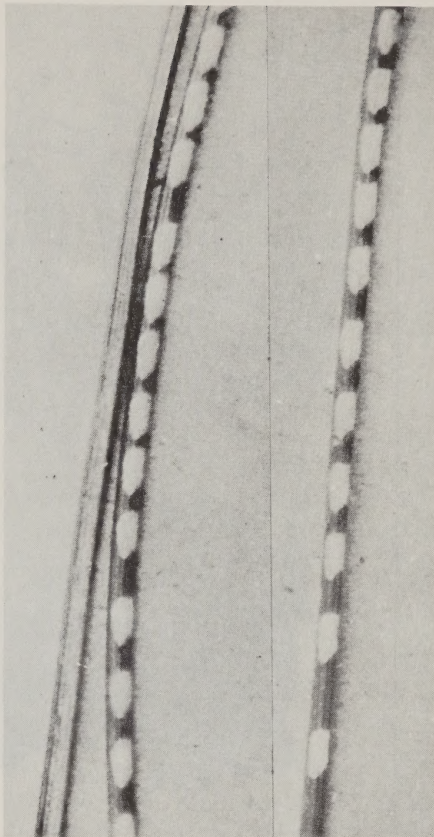
mating, and unfertilized eggs produce only male progeny. The eggs hatch in 3 to 5 weeks, depending on temperature and locality. The larvae feed gregariously, remaining on the host for 25 to 30 days. When fully grown, they drop to the ground and spin their cocoons.

A single generation per year occurs in most of Canada and parts of the Northern United States (fig. 5). A partial second generation or a complete second generation may appear at the latitude of Michigan and New York. Farther south there are at least two and frequently three generations per year; up to five have been recorded. Where more than one generation occurs, colonies of different ages may be found at the same time until late fall or early winter.

Natural Control

Outbreaks of the red-headed pine sawfly occur periodically and subside after a few years of heavy defoliation. The decline of these infestations is greatly influenced by rodents that destroy large numbers of cocoons; diseases that often kill tremendous numbers of larvae; and prolonged periods of high summer temperatures, or low temperatures and wet snowstorms in the early fall, that kill many larvae.

Fifty-eight species of parasites and predators have been reared in the United States and Canada. An egg parasite, *Closterocerus cinctipennis* Ashm., and the larval parasites *Spathimeigenia spinigera* Tns. and *Phorocera hamata* A. & W., are the most abundant.



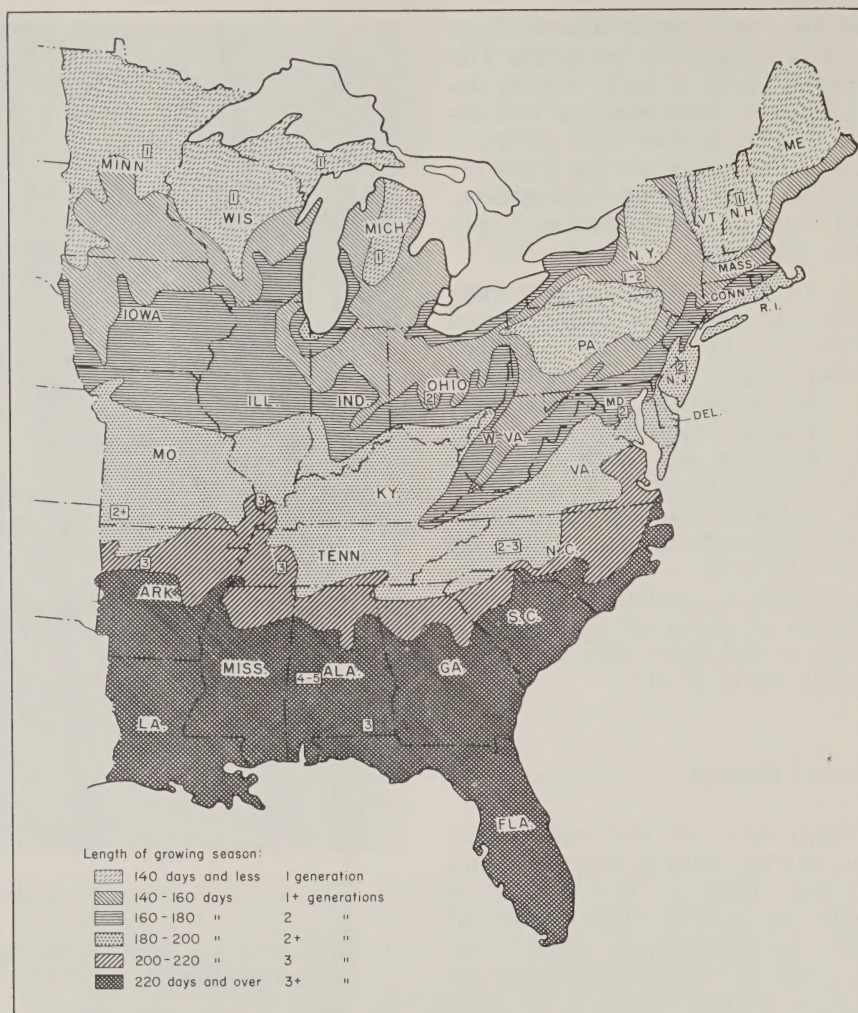
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Figure 4.—Red pine needles with eggs of the red-headed pine sawfly.

Direct Control

When only a few colonies of larvae are present on small roadside, ornamental, or plantation trees, they can be picked off or shaken from the trees and destroyed.

When the larvae are numerous, other means of control may be required. However, no insecticides are currently registered for use against this pest. Owners of seriously infested woodland should check with their county



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Figure 5.—Probable number of generations per year of the red-headed pine sawfly in the United States, based on length of growing season.

extension agent or with a forest insect control specialist to learn whether direct control measures have been developed.

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- Conducting forest and range research at over 75 locations ranging from Puerto Rico to Alaska to Hawaii.
- Participating with all State forestry agencies in cooperative programs to protect, improve, and wisely use our country's 395 million acres of State, local, and private forest lands.
- Managing and protecting the 187-million-acre National Forest System.

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